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RENICA BASED MUSIC SOURCE SEPARATION FOR AUTOMATIC MUSIC EMOTION CLASSIFICATION

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Abstract. *In music source separation, we deal with the problem of precisely separating the singing voice and instrumental accompaniment estimation in music mixtures. This problem is addressed through the use of signal processing algorithm called RENICA which refers to the combination of source separation methods namely, REpeating Pattern Extraction Technique (REPET), Nonnegative Matrix Factorization (NMF) and Independent Component Analysis (ICA). The separated estimation is later used for parameters modelling in automatic Music Emotion Classification (MEC). This paper aims to improve singing voice and instrumental accompaniment separation in 120-180 sec music signal length by merging three music source separation algorithms. From the experimental results obtained, this new combination of algorithms not only succeeds in separating better estimation but enhances the accuracy for emotion based music classification up to 97% for angry, peaceful, happy and sad emotion categories.*
Keywords: Music source separation, REPET, Nonnegative matrix factorization, Independent component analysis, Music emotion classification

1. **Introduction.** Music is a language of emotions [1]. Recently, emotion based music classification is regarded as one of the important researches in various fields including music information retrieval, psychology, active music listening and affective computing [2-4]. Musical content can be extracted and analyzed to model the emotion parameters in music for the classification. Many researchers also have been using musical timbre features in MEC for better accuracy. However, the incorporation of timbre features in both singing voice and instrumental accompaniment for Music Emotion Classification (MEC) is still in its infancy [5].

The exploitation of timbre features parameters in singing voice for automatic MEC became less affective if mixed with the instrumental accompaniment. Thus, the separation of both singing voice and instrumental accompaniment in MEC is crucial and failure to estimate the overlapping partials and separating musical component in the mixture may result in inaccurate classification.

Most of the source separation algorithms have been widely applied in solving numbers of problem in speech processing, speech denoising and 'Cocktail Party Problem'. However, due to the rapid growth in digital technology and music information retrieval, the use of source separation techniques has been expanded to cater problems which is related to music. For the past few years, we have witnessed various algorithms, manipulated to separate music mixture into estimated sources, including the latest REpeating Pattern

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